The morphological characteristics of the sparganum stage of the Malaysian *Spirometra* species

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Background: The present study describes the morphology of sparganum (larva) of the Malaysian *Spirometra* spp. collected from naturally infected frogs (*Rana cancrivora*) from rice fields in Tanjung Karang, Malaysia.

Materials and Methods: Spargana of *Spirometra* spp. collected from naturally infected frogs (*Rana cancrivora*) were used for the morphological studies. Stretched on a metal ruler, measurements of the worm were recorded. Specimens were stained in Alum-carmine.

Results: The length of the body ranged from 11-50 mm and the width ranged from 0.5-1.5 mm. Specimens stained with Alum-carmine showed ridges (formation of segments) on the surface of the body, and no sexual organs in the body.

Conclusion: The Malaysian *Spirometra* spp. are similar in measurement and morphology to *Spirometra erinacei* but further studies are required for confirmation.

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Key Words: Spirometra, spargana, scolex, body, morphology

Introduction

Spirometra spp. is a cestode and its larval form is known as the spargana. This larval form causes larval migrans in humans who consume under-cooked frog meat. There are 5 stages in the life cycle of *Spirometra* spp., which include the egg, coracidium, procercoid, plerocercoid (spargana) and the adult worm. The infective stages are the coracidium, procercoid and spargana. Egg and adult stages are not infective. The coracidium is infective to the cyclops (a zooplankton) which is the first intermediate host.[1] The procercoid is infective to the second intermediate hosts which are amphibians, reptiles, birds and mammals.[2,3,4] The spargana infect the definitive hosts (Canidae and Felidae) when they eat the second intermediate hosts in which they develop to the adult stage in their intestines. There is a difference in the morphology of every stage and which clearly distinguishes one stage from the other. The infection with spargana in humans is known as sparganosis.[5,6] In this paper we highlight some morphological characteristics of the plerocercoid (spargana) stage of the Malaysian *Spirometra* spp.

Materials and Methods

Spargana were collected from naturally infected frogs belonging to the species *Rana cancrivora*. Spargana were collected from 211 naturally infected frogs and 13 of these specimens were used for the measurements. The worms were placed in petri dishes with normal saline for 5 minutes to relax. They were then picked with fine forceps, stretched on a metal ruler and the measurements recorded. After this the spargana were killed with hot 10% formal saline and fixed with 70% ethanol. The specimens were hydrated by transferring them to down-graded alcohol series 70%, 50%, and 30% for 10 minutes each. After this the specimens were placed in distilled water for 10 minutes and then stained in Alum-carmine overnight and destained with dilute hydrochloric acid (HCl). They were then transferred to distilled water for 10 minutes and dehydrated in an upgraded alcohol series of 30%, 50%, 70%, 95%, and 100% with 10 minutes intervals. Thereafter the specimens were cleared in xylene for 2 minutes and mounted on glass slides using Canada balsam. The slides were incubated in the oven at 60°C for one week. The mounted specimens were examined under light microscopy (Leitz Wetzelar).

Results

The relaxed whole worms collected from the frogs are shown in Fig. 1. The spargana are long, have a large head, slender body and are ribbon-like in appearance. The length of the body ranges from 11-50 mm and the width from 0.5-1.5 mm as shown in Table 1. The scolex has a depression which is the undeveloped bothrium seen on the anterior aspect of the worm (Fig. 2).

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The body has ridges on the surface with no sexual organs seen in the body segments (Fig. 3).

Table 1: Measurements of 13 spargana recovered from the naturally infected frogs (*R. cancrivora*) collected from Tanjung Karang, Malaysia.

NO. OF SPARGANA	LENGTH (MM)	WIDTH (MM)
1	44	1
2	35	0.75
3	50	1
4	29	1
5	25	1.5
6	21	0.5
7	35	1
8	14	1
9	50	1
10	12	1
11	11	0.5
12	17	0.5
13	16	0.5
Mean	**27.6**	**0.9**
Range	**11 - 50**	**0.5 -1.5**

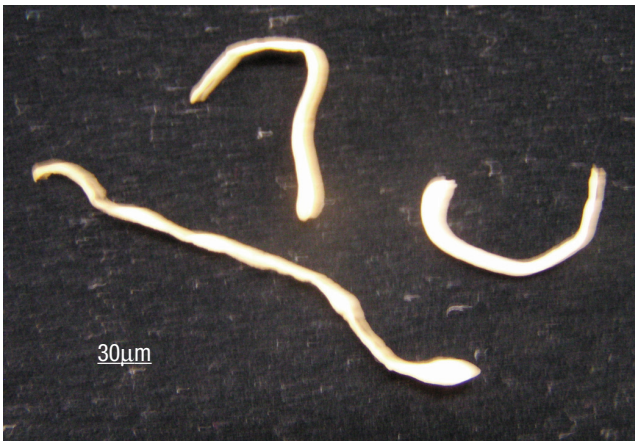

Fig.1: Spargana recovered from naturally infected frogs (*R. cancrivora*) shown to scale.

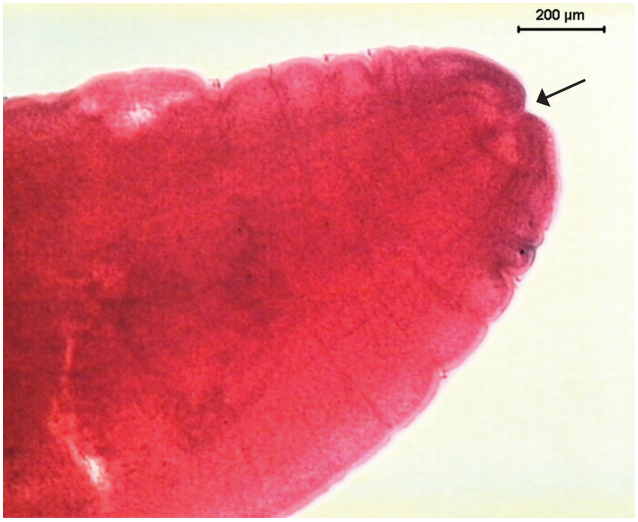

Fig.2: Scolex of the sparganum of the Malaysian *Spirometra* spp. showing the under-developed bothrium (depression) on the anterior end (arrow). (Alum-carmine stain)

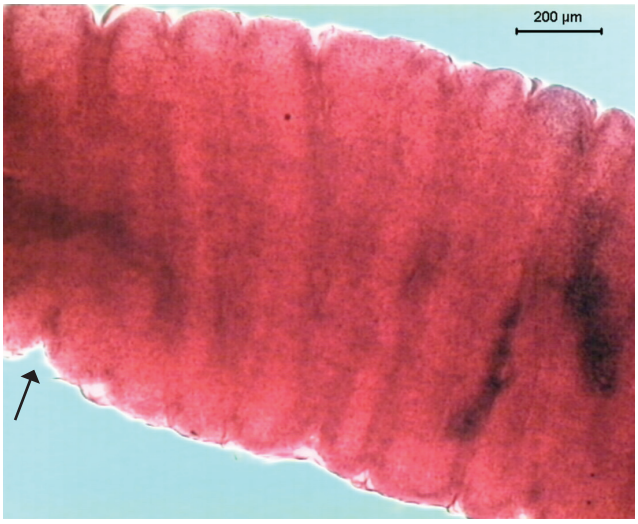

Fig.3: The sparganum collected from the naturally infected frogs (*R. cancrivora*) showing early segmentation marked by ridges (arrow). No sexual organs are seen in the body cavity. (Alum-carmine stain).

Discussion

Sparganum. the larval form of *Spirometra* spp. lacks specificity for intermediate hosts. It infects most vertebrates except fishes and are highly paratenic.[7] Once ingested by the host it penetrates the intestine and reestablishes itself in the tissues of the body wall or under the skin. Spargana can survive in the intermediate and paratenic hosts for a long time until they are eaten by the definitive host.[8] During their development in the second intermediate hosts the larvae grow slowly and increase in length and width.[9]

The spargana in the present study have a club shaped anterior scolex, with a broad middle part as indicated by ridges (body) with no sexual organs and a slender posterior part. This conforms to the description of the spargana of the *Spirometra* spp.[10,11,12] However more work has to be carried out on these larval forms to confirm the species of the *Spirometra* spp. found in these wild caught frogs in Tanjung Karang, Malaysia.

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